



**Constellation Energy®**  
Projects & Services Group

**Nashville District Energy, LLC**

*90 Peabody Street*

*Nashville, TN 37210*

**Fiscal Year  
2004 - 2005**

**Annual Report**

**DRAFT**

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### *Executive Summary*

Constellation Energy Projects and Services (CEPS), as the Operator of the District Energy System (DES), for the Metropolitan Government of Nashville, Tennessee, is pleased to present the second annual report on the status of the System. The fiscal year of July 1, 2004 through June 30, 2005 has been an exciting time for DES in Nashville as we saw the final acceptance and closeout of the construction project and a concentration on operations.

It has been a successful year in the areas of reliability, efficiency, safety and customer service. Metro and CEPS personnel have also worked hard to develop a relationship where both parties communicate to improve the level and quality of service to all customers. In this area it has been a very good year and we look forward to many more years.

FY 2004-2005 has seen a number of improvements to the system. The Energy Generating Facility (EGF) completed numerous tasks related to warranty issues following construction. As CEPS personnel continue to operate the plant we find new ways to complete tasks and improve the processes in place. The Energy Distribution System (EDS) has seen a number of improvements to the distribution piping. The metering project just getting underway will add tremendous value to both the customers and Metro. The customers continue to be pleased with the level of service they are receiving. Our customer service efforts routinely exceed expectations.

This report details activities over the past year. Areas of activity include plant operations performance, EDS performance, environmental, health, safety, marketing and finance. While we have had a very good year, we must look forward to completing a number of efforts in the new fiscal year. These efforts as compiled by CEPS and Metro representatives will continue to elevate the Nashville DES above others in the industry. This is critical to the growth of the system. CEPS looks forward to working with Metro in the new year.

Congratulations to all on a successful FY 2003-2004 and we look forward to FY 2004-2005.

Sincerely,

John Schaffer  
General Manager

### ***Plant Performance***

This report includes information on plant reliability, efficiency, acceptance testing and training.

#### ***Reliability***

The EGF continues to provide reliable service to the customers. The following items describe minor incidents, short in duration (thirty minutes or less), when the EGF experienced an excursion outside normal parameters. With the exception of uncontrollable circumstances and/or two allowable twelve-hour outages per year, the guarantees are to maintain 150 psig of export steam pressure leaving the EGF and to deliver 43.3 degree chilled water to each customer.

As reported in last years report, the plant has experienced several temporary power glitches, where the lights flickered and the condenser water pumps tripped off line. This in turn caused the chillers to trip on low water flow. Nashville Electric Service (NES) communicated to CNDE that our electrical trips coincide with them energizing capacitor banks which are switched daily. We have only experienced one electrical trip due to NES since this problem was discovered. These nuisance trips had no negative impact on the customers.

While investigating the cause of the single electrical trip mentioned above, it was discovered that our transformer leads had deteriorated. The break down of the wire insulation created a dangerous situation by arcing out inside the cabinets. General Electric's subcontractor, assisted by CNDE personnel, replaced all of the faulty leads under warranty.

On September 17<sup>th</sup> a city water main ruptured on 2<sup>nd</sup> Avenue. This *uncontrollable event* caused the plant to lose water pressure which caused the condensate tank water level and the cooling tower basin levels to drop. The control room operator on duty switched the VFD cooling water to condenser water, backed the boiler down and began taking chillers off line. He was able to keep circulating water through the chilled water lines during this three hour upset. The water department isolated the broken section of line and our pressure was restored. Through the diligent work of CNDE personnel, a forced outage was avoided.

General Electric issued a recall on 480-volt breakers used in the construction the EGF electrical system. A meeting was held September 23<sup>rd</sup> with General Electric representatives to determine the severity of the problem. A survey was conducted and it was concluded we had sixty three of the defective breakers. An enormous amount of planning and scheduling was required to perform these replacements without taking the plant down for an outage. A General Electric factory technician, assisted by CNDE personnel, repaired all of the questionable breakers during the month of October.

The plant experienced one chiller trip when one of the controls breakers was being changed. The chiller immediately restarted.

A *twelve-hour chilled water outage* was scheduled and conducted on December 19<sup>th</sup> to install vent lines on the condenser water system. This project was done to alleviate air entrainment in the supply lines to the condenser water pumps. A flex joint coupling was also installed in the discharge line from #2 Condenser Water Pump completing an earlier project to relieve pipe stress. The outage was completed three hours ahead of schedule.

#1 Boiler burner tripped off line during startup February 16<sup>th</sup>. Control panel wires were found to be loose inside the cabinet and were tightened. The gauge glass blow down valve was not totally secured and the header check valve stuck in the open position causing other on-line boilers to back feed into #1 boiler when blowing down. The check valve was cleared of debris and the blow down valve was shut. This problem has not reoccurred since this corrective action was taken.

On the morning of April 21<sup>st</sup>, the chiller plant tripped off line while testing the refrigerant alarm system. There are three levels of alarm on this system. The first alarm is the low or detection level, the second alarm is the mid or warning level and the third alarm is the high or danger level which does shut down all of the chillers. Chilled water service was back to normal in fifteen minutes.

CNDE maintenance personnel assisted with the chilled water tie-in for the new Symphony Hall. A chilled water service interruption on 4<sup>th</sup> Avenue was coordinated and executed by CNDE personnel for the Viridian Tower chilled water return line tie-in May 14<sup>th</sup>. A steam and chilled water service interruption on 7<sup>th</sup> Avenue and a chilled water service interruption on 4<sup>th</sup> Avenue was carried out June 3<sup>rd</sup> and 4<sup>th</sup>. The Viridian Tower chilled water supply line and steam and chilled water service lines for the Metro Public Library were connected to the existing EDS on these dates. Approximately 60,000 gallons of water had to be made up after draining these two sections of the system.

Tennessee Towers chilled water pumps have tripped off line several times in the past few weeks. When this occurs, it over pressurizes our system and causes our chilled water temperature to spike up. They are working to correct their electrical problems; however, if this continues, we are at risk for potential chilled water leaks in the EDS. This problem will be corrected when the project to decouple their building is completed. In the interim period, we are actively seeking a short term solution to this problem.

### *Efficiency*

Following the annual boiler inspections and due to the reduced steam demand in the summer months, two boilers were placed in dry lay-up, one in wet stand-by, and one de-aerator tank was isolated. One boiler and one de-aerator were left on line. This equipment is rotated monthly. This is done to increase steam efficiency during the cooling season. Stand-by boilers are taken out of dry lay-up and the second DA Tank was put back in service during the month of November in preparation for the heating season.

On September 16, 2004, we received a notice from Nashville Gas of a possible natural gas curtailment due to the multiple hurricanes moving through the Gulf of Mexico. CNDE ordered and took delivery on one tanker load of propane. The propane system was tested in preparation for this event if it were to happen.

Natural gas usage per pound of steam produced has increased due to the lack of condensate being returned. The condensate line repair/replacement projects are scheduled to begin in August 2005.

The chilled water make-up has increased over the past few months. CNDE personnel are actively seeking the cause. Dye has been inserted in to the chilled water system; however, no leaks have become apparent.

In addition to the three new customers recently connected to the EDS, (Schermerhorn Symphony, Metro Public Library, Viridian Tower) there has been outstanding customer service activities and support to the existing DES customers. These customer service activities will help promote the existing building owners to help us in our sales efforts.

Constellation submitted the final Metro DES annual reconciliation for Fiscal Year 2004-2005 on \_\_\_\_\_. The annual reconciliation for this time period, consisted primarily of a true-up on Constellation's fuel efficiency adjustment (FEA) based on Constellation's efficiency guarantees as set forth in Section 13.01(d) of the ARMA between Metro and Constellation. For reference, the annual reconciliation is included herein in Appendix 4.

Constellation's efficiency guarantees consist of five key conversion rates:

1. Electric-to-Steam (kWh per klb-sold)
2. Fuel-to-Steam (Dekatherm per klb-send-out)
3. Water-to-Steam (gallons)
4. Electric-to-Chilled Water (kWh per ton-hr-sold)
5. Water-to-Chilled Water (gallon per ton-hr-sold)

The formulas for calculating the above conversion rates are as submitted by Constellation on July 27, 2005. (Exhibit 1 – attached)

Due to metering inaccuracies at the customer locations, Constellation and Metro has previously agreed to add a 25% “buffer” to the efficiency guarantees and FEA rates associated with 1, 4, and 5 above. This buffer will remain in effect until the metering inaccuracies at the customers are remedied.

The results of the key conversion rates are provided below:

	Units of Measure	Contractual Guarantee	Guaranteed Maximum Rate	FEA Rate	Actual Rate
1. Electricity-to-Steam	kWh per klb	6.000	7.500 *	4.500 *	2.603
2. Fuel-to-Steam	Dth per klb	1.815	1.747	1.677	1.462
3. Water-to-Steam	Gallons	41,773,973	41,773,973	41,773,973	33,565,834
4. Electric-to-Chilled Water	kWh per ton-hr	1.055	1.319 *	0.791 *	0.915
5. Water-to-Chilled Water	Gallons per ton-hr	5.250	6.563 *	3.938 *	1.848

*\* - Denotes value subject to 25% buffer resulting from metering inaccuracies at the customer locations*

### ***Acceptance Testing***

The Ten-Day Chilled Water Acceptance Test was conducted July 19 - 29, 2004. The Four-Hour Chilled Water Capacity Test was conducted July 22, 2004. The final Chilled Water Acceptance Test Report, issued August 26<sup>th</sup>, verified CEPS and the EGF passed both tests.

The Ten-Day Steam Reliability and Efficiency Acceptance Test was conducted January 5-15, 2005. The Test Report was distributed February 1, 2005. This test was determined successful and has been accepted and approved by Metro. The EGF achieved contract requirements for steam production and steam flow during the Four-Hour Steam Capacity Test conducted in January 2004. CES employees and the Metro DES team are to be commended for the long hours and extra effort required to perform these tests.

### ***Training***

In order to maintain and operate a state-of-the-art facility reliably and efficiently a significant amount of employee training is required. The following demonstrates some of the training that was conducted throughout the year:

- **Computerized Maintenance Management System (CMMS)**  
Training classes were held on site October 18 and 19 for our “iMaint” Computerized Maintenance Management System (CMMS). This class identified new program upgrades recently installed.
- **Water Treatment System**  
A boiler and cooling tower chemical treatment seminar was attended by plant personnel on October 12<sup>th</sup>. The seminar, held at the Nashville Airport Marriott, was conducted by a chemical vendor.  
  
ChemTreat, Inc., our new chemical vendor, conducted new product and procedures training classes for the operators and mechanics in May.
- **Controls System**  
The Instrumentation and Electrical Supervisor and one Instrument Technician attended Siemens training in Atlanta, GA.
- **Personal Development**  
The CNDE General Manager attended Personal Development training in Baltimore in March and April. This is required training for all Constellation Energy executives.
- **Computer**  
Several employees attended excel computer classes at a local college.

Our training program is on-going year after year. Monthly training classes are conducted in conjunction with our safety meetings.



### *System Assessment and Status*

This report addresses an assessment of the condition of the entire district energy system, details of repairs and modifications, and an analysis of same.

#### **Energy Generation Facility (EGF)**

The EGF has operated reliably and efficiently for the past year. During the course of normal operation, preventative, predictive and routine maintenance items must be scheduled and completed. From time to time emergency repairs and replacements must be done. The items in the following sections were accomplished to increase equipment life, reliability, efficiency and/or safety.

#### ***Preventive and Predictive Maintenance***

CNDE personnel perform daily equipment inspections, check bearing temperatures, oil levels, belt tensions, etc. In addition, preventative maintenance is performed on the following equipment monthly: HVAC units, cooling towers cell, condenser water pumps, chilled water pumps, boiler feed water pumps, condensate pumps, motors, instrument air compressors and driers. The roof surface is inspected and cleaned. The propane system is also test fired and leak checked monthly.

Annual pressure vessel inspections are scheduled to be completed during the cooling season. The inspections are conducted by a State Certified, Insurance Company, Boiler Inspector. These inspections are required in order to renew our operating permits. Boiler inspections consist of a visual examination of the mud drum, steam drum, economizer, tubes and fire box. #1 and #2 boilers were inspected in June. #3 and #4 boilers are scheduled to be inspected in July. #1 and #2 de-aerator tanks were also inspected. All units passed and permits were renewed. Inspections are usually witnessed by our chemical vendor's representative and plant personnel. When units are off line for inspection, preventative maintenance is performed on the forced draft fans low water cut out switch and other associated equipment.

Annual chiller inspections, although not required like boilers, are scheduled and executed during the heating season as a good maintenance practice. These inspections include opening the condensers and cleaning the tubes, performing vibration analysis and taking oil sample analysis on each chiller. Controls and purge units are also checked for proper operation.

As part of the Preventive and Predictive maintenance program CNDE had a contractor take baseline alignment and vibration readings on all pumps, fans and motors. All readings were all within the normal ranges. Last year, it was discovered that eddy currents from the Variable Frequency Drives (VFD) on the chilled water pump motors were causing bearings to fail prematurely. Insulated bearings were installed on pumps 1 and 4 to correct this problem. The bearings on pumps 2, 3 and 6 were replaced this year.

### ***Modifications and Improvements***

A twelve-hour chilled water outage was scheduled and conducted on December 19<sup>th</sup> to install vent lines on the condenser water system. This project was done to alleviate air entrainment in the supply lines to the condenser water pumps. A flex joint coupling was also installed in the discharge line from #2 Condenser Water Pump completing an earlier project to relieve pipe stress. The outage was completed three hours ahead of schedule.

Softener isolation valves were installed on the supply and discharge of each tank to make it possible to trouble shoot and perform maintenance more effectively. In order to complete this project without taking a steam outage a lot of tedious planning and scheduling was required.

To enhance the appearance of the plant and to aid in house keeping, all pumps and pedestals were painted. The floors and walls in the boiler room, chiller area and pump area were also painted. The reflective nature of the painted surfaces helped increase illumination in these areas.

The Men's Restroom was modified by replacing the urinal with a second toilet and stall. With twenty five men sharing the same facilities, there were times when this became an emergency.

CNDE re-bid the EGF chemical contract due to the unsatisfactory water treatment results of the original vendor. The successful bidder, ChemTreat, Inc., began service May 2, 2005. Improvements to the cooling tower and boiler water treatment have already become evident.

A summer condensate meter was installed in the EGF to try and get a more accurate reading during low flow situations.

### ***Routine Maintenance and Emergency Repairs***

#1 and #2 boilers were drained, opened and cooled May 25, 2005. Both units were inspected on by a F. M. Global Company Boiler Inspector (our boiler insurance carrier-authorized by the Tennessee State Boiler Inspector's office), a ChemTreat representative (our new chemical vendor) and CNDE personnel. Several hair line cracks were identified in the refractory around the burner openings in the firebox. These cracks are considered normal; however, it was recommended the cracks in #2 boiler be patched to prevent heat loss and the possibility of future degradation. These repairs were made as requested.

#2 De-aerator (DA) tank vent line fractured due to stress. When the tank is on line, it heats up and moves. The attached vent line piping exits the building through a roof penetration thus making it rigid. CNDE hired a code weld repair contractor to replace the broken pipe nipple. A flexible joint was then installed on both DA tank vent lines to prevent this from reoccurring.

While investigating the cause of an electrical trip, it was discovered that our transformer leads had deteriorated. The break down of the wire insulation created a dangerous situation by arcing out inside the cabinets. General Electric's subcontractor, assisted by CNDE personnel, replaced all of the faulty leads with a higher quality wire under warranty.

General Electric issued a recall on 480-volt breakers used in the construction the EGF electrical system. A meeting was held September 23<sup>rd</sup> with General Electric representatives to determine the severity of the problem. A survey was conducted and it was concluded we had sixty three of the defective breakers. An enormous amount of planning and scheduling was required to perform these replacements without taking the plant down for an outage. A General Electric factory technician, assisted by CNDE personnel, repaired all of the questionable breakers during the month of October.

Other routine repairs included items such as, calibrations, roof fan belts, flange leaks, chemical feed line leaks, pump packing, emergency light batteries, etc.

House keeping and janitorial duties are performed daily. During the summer months the lawn and landscaping is attended to at least once per week.

### **Energy Distribution System (EDS)**

The **Energy Distribution System (EDS)** continues to furnish reliable service considering the age of the piping. The direct buried lines are approximately thirty years old. The tunnel system and its piping and supports are approximately twenty years old.

#### ***Preventive and Predictive Maintenance***

All the direct buried portions of the EDS are checked monthly by means of thermographic imaging. When a hot spot or cool spot is detected, it indicates a possible leak in our piping. Depending on the severity of the thermal temperature variance from the surrounding area, a determination is made whether to dig up the affected area.

CNDE maintenance personnel perform monthly tunnel and manhole inspections. The condition of the structures, piping, supports, insulation, seals, lighting and ventilation is documented. Any deficiencies noted are prioritized and scheduled for repair accordingly.

When the customer meter readings are taken for the preceding month, the readings are reviewed. If they vary 30% high or low, from the three year average, I&E personnel check the questionable metering devices for calibration as required in the customer buildings.

#### ***Routine Maintenance and Emergency Repairs***

An emergency leak repair was made to the main condensate return line at the intersection of First Ave. and Broadway. A second emergency repair was completed on the same line in manhole L. Both repairs were performed by Colt Contracting, a division of Nashville Machine. Due to this being the main artery between the EGF and the EDS tunnel, a DES Project to replace both the steam and condensate line from manhole 18 to manhole L is scheduled to begin August 2005.

The condensate return line from the Metro Courthouse has also been repaired twice in the past year. The first time, a contractor line ruptured our line with a backhoe while trenching for the installation of a new city water line. The second leak was suspected to be caused by a water hammer on this deteriorated piping. This is the only section of fiber glass piping remaining in the system. Replacement of this line has been recommended for consideration as a 2006 DES Project.

An emergency project to replace the vault at manhole 5 has recently been completed. The original structure was steel. It had rusted out around the bottom allowing the backfill to enter the cavity. This made the manhole too dangerous to enter. There was also the possibility of collapse as city buses travel across the top of this structure. The new structure is concrete and should give us many years of service.

The main condensate line from the State steam tunnel back to the EDS ruptured. An emergency project to replace this line was initiated. The line is enclosed in a small pipe chase from the Andrew Jackson Building parking garage to the tunnel underneath Charlotte Avenue. When the old piping was being demolished, it was discovered to have an off set. This made it impossible to remove the old pipe from either end of the chase. The street had to be dug up to remove the off set. The new piping has since been installed. Final tie-ins are scheduled to be completed by the end of July 2005.

The Andrew Jackson Building trap line leak, prior to the first isolation valve inside the mechanical room, posed a safety hazard. The main steam isolation valve did not function properly and had to be replaced. An isolation valve on the condensate receiver tank also had to be installed to safely make these other repairs. This work was scheduled and completed June 7-8, 2005.

When steam leaks occur in the EDS, CNDE hires an on-line repair contractor to facilitate these repairs without interrupting service to the customers. Several expansion joints and valves were repaired throughout the system during the past year.

CNDE I&E personnel checked and calibrated the metering devices as required in customer buildings. Temporary data recorders were installed at representative customer buildings for the Chilled Water Acceptance Test.

The level controller and communications modem for the condensate tank pumps in manhole 18, in front of the Hard Rock Cafe, were replaced by the manufacture as warranty items.

Several valves, trap assemblies, etc. were replaced throughout the system as routine maintenance items.

*Outstanding Issues and Recommendations*

**Outstanding Issues**

- Resolution of Amended and Restated Management Agreement (ARMA)
- Resolution of Change Order 6B
- Resolution of Amended and Restated Fuel Procurement Agreement (ARFA)
- FY 2004 Fuel Efficiency Adjustment
- Condensate Return Policy

**Recommendations**

- Tennessee Tower Condensate Disposal
- Tunnel Lighting and Electrical Rehabilitation
- State Tunnel Communications System
- 7<sup>th</sup> Avenue Tunnel Structural Repairs
- Ryman Auditorium Condensate Line Replacement
- Metro Courthouse Condensate Line Replacement
- Pipe insulation restoration in manholes
- Pipe insulation restoration in tunnels
- Installation of control valve on heat exchanger at the Sheraton Hotel

### ***Operations Summary***

Constellation Nashville District Energy, LLC (CNDE) submits a written operations report to the Metro Nashville District Energy System (DES) team on the 10<sup>th</sup> day of each month to convey the activities of the prior month. The first item included in each report is the executive summary. This section gives an overview of the entire report, addresses news, events, and other business activities. The next section is Operations, which includes plant reliability and efficiency data, environmental issues, personnel, safety, accidents and employee training. The third section of the report lists and discusses all Maintenance activities in and around the Energy Generation Facility (EGF). Items covered in this section include the building and grounds, warranty issues, preventive and predictive maintenance and construction projects. The final section of these reports is in regard to the Energy Distribution System (EDS). Items discussed in this section are customers, sales and marketing, system maintenance and repairs, and distribution system projects.

#### **Executive Summary**

The EGF continued to furnish reliable steam and chilled water service to the customers over the past twelve months. With the exception of projects, generally related new customer service connection tie-ins, service has been uninterrupted. Customer's issues have been dealt with courteously and expeditiously. All customers are reported to be satisfied with services they are being provided.

The plant continues to be fully staffed with an outstanding work force. There were two minor accidents during the last few months. Neither was an OSHA reportable or lost time accident. Another exceptional accomplishment was there were no environmental violations for the year.

Training classes were routinely conducted in conjunction with the monthly Safety Meetings. Employees have also received additional training related to plant systems and equipment. Some employees have elected to take continuing education classes.

Maintenance activities were performed as scheduled in the EGF and in the EDS. A great deal of planning and coordination go into the project work both in the plant and in the distribution system. Contractors continue to work to resolve warranty related items.

#### ***News***

- CNDE purchased a service truck and welding machine for use primarily in the EDS. A passenger van was also purchased as a customer service vehicle.
- A DES E-newsletter was published and distributed in the fall and another in the spring.

- The first meeting of the Metro DES Advisory Board was held in the EGF conference room November 18<sup>th</sup>. The board is scheduled to meet quarterly on the third Thursday of the month.

### ***Events***

- During July, CNDE hosted their First Annual Golf Outing and luncheon. This event was a tremendous success. The event, attended by customers, employees, contractors, vendors and friends, boosted customer relations and employee moral. Everyone who participated had a great time.
- Constellation Energy is very community oriented. CNDE employees participated in fund raising events for the United Way and the Muscular Dystrophy Association just to mention a few.
- A natural gas procurement briefing was conducted by Fellon – McCord for Metro, CEPS and the customers December 16<sup>th</sup>. A handout was distributed at the meeting which included a company overview and a natural gas market overview and outlook.
- The EGF celebrated its first year of stellar operation December 16<sup>th</sup>. This event marked another major milestone in the history of district heating and cooling in Nashville. A sculpture of the Shelby Street Bridge was presented to Metro, via David Manning, Metro Finance Director, in a morning ceremony. The sculpture, built by Ed Gershman, was constructed of recycled materials from the old Thermal plant. It is displayed in the EGF lobby along with a plaque listing contractors associated with the project. A dedication ceremony was held in the afternoon with John Schaffer, General Manager of Constellation NDE, Greg Jarosinski, President of Constellation Energy Projects and Services Group, Bill Purcell, Mayor of Nashville and Harvey Gershman, Project Administrator for Metro Nashville DES.
- A CNDE employee holiday luncheon was held December 17<sup>th</sup>.
- The annual Constellation Energy corporate meeting was attended by CNDE management personnel in Baltimore February 17, 2005.
- Required training for all Constellation Energy executives was attended by the CNDE General Manager March 2, 2005.
- CES personnel attended the Tennessee One-Call annual meeting.
- CNDE and NDES team members were given a tour of the new Nashville Symphony Hall April 21, 2005. We are proud to have this impressive facility as a new customer.



***EGF Tours***

- Representatives from Nashville Gas toured the facility on September 28, 2004.
- A tour for the newly appointed DES Advisory Board members was given November 18<sup>th</sup>.
- Piedmont Gas Company conducted a photo shoot in and around the EGF on December 2<sup>nd</sup>. The photographs were included in their annual report.
- A tour was conducted on December 13<sup>th</sup> for university and college Facility Managers.
- Fellon-McCord fuel procurement representatives toured the plant December 16<sup>th</sup>.
- A tour of EGF was conducted for approximately 30 attendees of the Energy Solutions Center conference held in Nashville the week of February 23<sup>rd</sup>.

***Other Business***

- Monthly DES coordination conference calls, conducted the first Tuesday of each month, and monthly CNDE/DES operations meetings, held on the third Wednesday of each month, were participated in by CNDE managers and DES team members.
- The Ten Day Chilled Water Acceptance Test was successfully completed July 29, 2004. The Ten Day Steam Acceptance Test was successfully completed January 15, 2005. These milestones fulfilled the final testing requirements of the contract and allowed the construction portion of this project to be closed. Many long hours were and extra effort was required performing these tests.
- A new Construction Administration position was created to oversee DES construction projects. This position was filled September 1, 2004.
- Constellation Energy Source (CES) changed its name to Constellation Energy Projects and Services Group (CEPS).
- CNDE re-bid the EGF chemical contract due to the unsatisfactory water treatment results of the original vendor. The successful bidder, ChemTreat, Inc., began service May 2, 2005.
- The CNDE Operations Manager and the Customer Service Representative attended the IDEA Conference in St. Paul, MN the last week of June. Next years conference is scheduled to be held in Nashville.

## **Operations**

### ***Plant Reliability***

The EGF provided excellent steam and chilled water service to the customers throughout the year.

On September 16<sup>th</sup>, we received a notice from Nashville Gas of a possible natural gas curtailment due to the multiple hurricanes moving through the Gulf of Mexico. CNDE ordered and took delivery on one tanker load of propane. The propane system was tested in preparation for this event if it were to happen.

On September 17<sup>th</sup>, a city water main ruptured on 2<sup>nd</sup> Avenue. The plant lost its water pressure causing the condensate tank water level and the cooling tower basin levels to drop. The operator on duty switched the VFD cooling water to condenser water, backed the boiler down and began taking chillers off line. He was able to keep circulating water through the chilled water lines during this three hour upset. The water department isolated the broken section of line and our pressure was restored. Through the diligent work of CNDE personnel, a forced outage was avoided.

General Electric has issued a recall on 480-volt breakers used in the EGF. An enormous amount of planning and scheduling was required to replace these faulty breakers. The plant experienced one chiller trip when one of the control breakers was being repaired. The chiller immediately restarted and there was no disruption in service.

A twelve-hour chilled water outage was conducted on December 19, 2004 to install vent lines on the condenser water system. This project was done to alleviate air entrainment in the supply lines to the condenser water pumps. A flex joint coupling was also installed in the discharge line from #2 Condenser Water Pump completing an earlier project to relieve pipe stress. This outage was completed three hours ahead of schedule.

#1 Boiler burner tripped off line during startup February 16<sup>th</sup>. It was discovered that control panel wires inside the cabinet were found to be loose and were tightened. The gauge glass blow down valve was not totally secured and the header check valve stuck in the open position causing other on-line boilers to back feed into #1 Boiler when blowing down. The check valve was cleared of debris and the blow down valve was shut. There have been no boiler trips since this action was taken.

While investigating the cause of an electrical trip, it was discovered that our transformer leads had deteriorated. The insulation break down on the wire created a dangerous situation by arcing inside the cabinets. The leads were repaired temporarily. General Electric replaced these leads and some faulty control transformers under warranty.

### ***Plant Efficiency***

Plant performance guarantees were amended to +/- 25% during the initial start up phase of operation due to the questionable accuracy of customer meters. A customer metering upgrade project is expected to begin in July 2005. Upon completion of this project, contractual guarantees will be put in place. As described in the Plant Performance section, all applicable guarantees have been met since start up.

A condensate line leak between Manhole 18, in front of the Hard Rock Cafe, and Manhole L, at the flag poles in Riverfront Park, is seriously hindering us from receiving condensate return from the EDS. This causes an increase in boiler make up water which in turn increases natural gas and electricity usage per pound of steam produced. A project to replace this line is scheduled for August 2005.

Due to the reduced steam demand in the summer months, two boilers were placed in dry lay-up, one in wet stand-by, and one de-aerator tank was isolated. One boiler and one de-aerator were left on line. This equipment is rotated monthly.

### ***Environmental Issues***

There have been no environmental violations since start up. A Metro Public Health Department, Air Pollution Control Division, representative conducted an annual inspection of the facility, our records, permits, etc. in May. Everything was found to be in order.

### ***Personnel***

The plant is fully staffed with an outstanding work force. In September, CNDE added and filled a new Project Administrator position. This position was created to aid in the implementation of DES projects. This position is included in Change Order 6A.

### ***Safety and Accidents***

Safety meetings are held monthly. Safety related training classes are held in conjunction with these meetings.

There were two minor accidents during the last few months. Neither was an OSHA reportable or lost time accident.

### ***Training***

Employees routinely receive additional training. A boiler and cooling tower chemical treatment seminar was attended by plant personnel on October 12<sup>th</sup>. The seminar, held at the Nashville Airport Marriott, was conducted by a chemical vendor.



Training classes were held on site October 18 and 19 for our “iMaint” Computerized Maintenance Management System (CMMS).

The CNDE General Manager attended Personal Development training in Baltimore in March. This is required training for all Constellation Energy executives.

ChemTreat, Inc., our new chemical vendor, conducted new product and procedures training classes for the operators and mechanics in May.

The Instrumentation and Electrical Supervisor and one Instrument Technician attended Siemens training in Atlanta, GA. The same two men also attended excel computer classes, at a local college, earlier in the month.

### **Maintenance**

- Monthly predictive and preventative maintenance activities were performed as scheduled in the EGF.
- Housekeeping, painting and lawn care duties have also been performed routinely.
- Contractors are working diligently to complete warranty related items.

### **Energy Distribution System**

#### ***Customer Service***

As part of our customer service program, CES routinely communicates with the customers each month. All customers are reported to be satisfied with our services.

#### ***Maintenance and Repairs***

Preventative maintenance is conducted monthly. This includes a monthly thermographic survey of the system, tunnel inspections and inspection of each of the manholes. During the past year we have assumed responsibilities in the State steam tunnel, as well as, the new Beverly Briley building tunnel.

Repairs include routine and emergency items. Examples of these include: on-line steam leak repairs, condensate line repairs, leaking valves, flanges, etc. Repairs are completed by a combination of CNDE personnel and subcontractors. Many of these jobs require off duty policemen to perform traffic control.

#### ***Projects***

CNDE personnel continue to with the new Project Administrator to coordinate and monitor DES projects as agreed to in Change Order 6A.

***Environmental, Safety and Regulatory Compliance Summary***

There have been no environmental violations since start up. A storm water pollution prevention plan was developed and implemented to meet State permitting requirements. Samples are collected, inspections are conducted and a report is completed quarterly.

The semiannual monitoring report and annual emissions compliance certifications were completed and submitted, as required, prior to January 31, 2005. The annual compliance certification consists of a detailed account of the compliance status for each permit condition.

The Tier II Emergency and Hazardous Chemical Inventory Forms were completed and submitted to the proper authorities February 23<sup>rd</sup>. The annual Emissions Inventory Reports were also completed and submitted to the Metro Health Department as required.

The annual chlorine emissions inventory report was completed and submitted to the Metro Health Department April 8<sup>th</sup>.

Metro Public Health Department, Air Pollution Control Division, conducted their annual inspection of the facility, our records, permits, etc. in May. Everything was found to be in order.

Monthly safety meetings have been coordinated and scheduled by the CNDE Operations Manager/Safety Officer. A safety training class is conducted in conjunction with each safety meeting. These classes consisted of:

- Hazardous communications
- Blood borne Pathogens
- Work Place Violence
- Confined Space Entry
- Storm Water Pollution Prevention
- Slips, trips, and falls
- Forklift, scissor lift and snorkel lift training
- Steam System Safety
- Personal Protective Equipment
- Heat Stress
- MSDS and Chemical Safety
- Fire Extinguisher Training

Safety reports are issued and posted each month.

Plant personnel suffered two minor accidents during the last few months. The first occurred when a mechanic was working on a trap assembly in the tunnel. He had isolated the trap station and when he removed the drain plug from the strainer, the steam trapped



between the valves, blew out and burned his forearm. He administered first aid to himself and went back to work.

The second accident occurred when an operator slipped and fell from an extension ladder while isolating a chemical feed line leak. He was not seriously injured, but was sore for a couple of days. Neither was an OSHA reportable or lost time accident.

Annual State boiler inspections were scheduled to coincide with the cooling season. These inspections were performed by our insurance carrier representative and witnessed by our chemical treatment vendor. These activities were coordinated by our Maintenance and Operations Supervisors.

### ***Fuel Procurement***

During FY 2004-2005, CES provided proactive support to Metro in the area fuel procurement and risk management. Metro, in a collaborative effort with CEPS, Fellow-McCord and Associates, Inc. and Gas Supply Consulting Company, made all natural gas procurement decisions and purchases. Procurement decisions were made based upon a matrix of pricing and consumption factors including but not limited to then-current pricing conditions, future pricing conditions, technical and fundamental pricing trends, consumption variances as a function of incremental demand and conservation and budgetary considerations. All natural gas supply was procured from Atmos Energy Marketing Company (“AEM”) under the terms and conditions of an agreement between Metro and AEM for a service period encompassing FY 2005 and extending through June 2006.

Following is a report of the natural gas purchases made in FY2004-2005:

#### **Natural Gas**

Month	Quantity (DT)	Unit Cost	Amount
July 2004	21,696	\$ 6.938	\$ 150,523.47
August	23,192	\$ 6.816	\$ 158,075.16
September	24,087	\$ 6.482	\$ 156,137.66
October	31,537	\$ 7.372	\$ 232,500.85
November	43,679	\$ 7.665	\$ 334,795.52
December	64,585	\$ 7.725	\$ 498,929.28
January, 05	70,951	\$ 7.689	\$ 545,515.99
February	56,520	\$ 7.680	\$ 434,083.39
March	55,228	\$ 7.449	\$ 411,392.79
April	36,814	\$ 7.492	\$ 275,805.83
May	29,069	\$ 7.502	\$ 218,058.45
June	20,599	\$ 7.845	\$ 161,603.82
Total	477,957	\$ 7.485	\$ 3,577,422.21

### Propane

Month	Quantity (Gal)	Unit Cost	Amount
July, 04	-	\$ -	\$ -
August	-	\$ -	\$ -
September	-	\$ -	\$ -
October	-	\$ -	\$ -
November	18	\$ 6.000	\$ 108.00
December	794	\$ 6.000	\$ 4,764.00
January, 05	118	\$ 6.000	\$ 708.00
February	-	\$ -	\$ -
March	-	\$ -	\$ -
April	-	\$ -	\$ -
May	-	\$ -	\$ -
June	-	\$ -	\$ -
<b>Total</b>	<b>930</b>	<b>\$ 6.000</b>	<b>\$ 5,580.00</b>

### Electricity

Month	Quantity (Kwh)	Unit Cost	Amount
July, 04	5,892,000	\$ 0.057	\$ 337,587.23
August	5,236,000	\$ 0.057	\$ 300,694.43
September	4,704,000	\$ 0.056	\$ 265,585.32
October	3,780,000	\$ 0.061	\$ 228,951.60
November	2,716,000	\$ 0.072	\$ 196,659.20
December	2,296,000	\$ 0.080	\$ 183,912.20
January, 05	2,520,000	\$ 0.076	\$ 190,710.60
February	2,044,000	\$ 0.086	\$ 176,264.00
March	2,380,000	\$ 0.078	\$ 186,461.60
April	3,052,000	\$ 0.068	\$ 206,856.80
May	3,780,000	\$ 0.061	\$ 228,951.60
June	5,292,000	\$ 0.057	\$ 303,423.54
<b>Total</b>	<b>43,692,000</b>	<b>\$ 0.064</b>	<b>\$ 2,806,058.12</b>



**Water & Sewer**

Month	Quantity (Kgal)	Unit Cost	Amount
July, 04	11,607	\$ 4.541	\$ 52,707.96
August	10,904	\$ 4.621	\$ 50,381.25
September	9,058	\$ 4.758	\$ 43,099.54
October	6,933	\$ 4.975	\$ 34,495.89
November	6,449	\$ 5.158	\$ 33,261.34
December	5,864	\$ 5.135	\$ 30,116.11
January, 05	7,401	\$ 4.961	\$ 36,719.54
February	5,663	\$ 5.024	\$ 28,454.17
March	6,355	\$ 5.127	\$ 32,582.59
April	7,164	\$ 4.887	\$ 35,007.17
May	8,784	\$ 4.819	\$ 42,325.52
June	11,355	\$ 4.581	\$ 52,018.34
<b>Total</b>	<b>97,536</b>	<b>\$ 4.831</b>	<b>\$ 471,169.42</b>

### *Marketing and Sales Overview*

#### **Sales and Marketing Review 2004 - 2005**

The Nashville District Energy System is coming off a successful year in the sales and marketing efforts as initiated during the transition period. The DES has gotten both local and national recognition from receiving a Tennessee Society of Consulting Engineers award for design excellence and continued national exposure from IDEA awards for adding new customers.

#### ***Sales***

The sales and marketing target for last year was to add three customers to the system; the sales & marketing team signed two customers including one new firm chilled water and an interruptible heating and cooling customer.

The first new downtown condominium building, the Viridian has executed a new chilled water contract and the Metro Nashville Library has executed the only interruptible heating and cooling contract on the system. Both customers should start receiving service in 2006.

Several buildings declined service last year including a new building to be called the Sun Trust Plaza and the Stahlman building's conversion to apartment units. In retrospect, the developers position was that conventional HVAC systems were least expensive than interconnection to DES. The issue of self-generation model analysis comparing DES versus existing and new HVAC technology needs to be addressed. The self-generation models have relied heavily on industry standards and not actual data as have been presented by the proposed customer's consultants.

In addition prior to the sales process DES needs to be actively involved with the development community. The relationship and trust between both parties should not start at the negotiation table.

Several customers that were targeted this year are still viable candidates for DES. The L & C Tower is in the process of changing owners and will be contacted once that process is complete.

The Courtyard Marriott in downtown Nashville has reviewed the potential of heating and cooling services and they will defer discussion until the hotel has completed interior renovation that is consuming their capital. The hotel will have to invest capital dollars for changing package units with fan coils in order to connect to DES. Facilities management at the hotel supports interconnect to DES.



We are actively pursuing the new Federal Courthouse with GSA reviewing our proposal. The courthouse is currently on hold due to funding problems.

The Nashville Sounds have selected the old Thermal site for a new ballpark and mixed use development. We are targeting to develop a relationship with the developer and technical team prior to negotiation for heating and cooling services.

The Rolling Mill Hill area appears not to be a good candidate for DES due to low density buildings being developed in the area. The Rolling Mill Hill area will be continually monitored to see if eventually there is a potential to interconnect a building. In addition, the sales process was initiated with several downtown buildings, reviewing the option of connecting to the DES, Bank of America Plaza and One Nashville Place.

### ***Marketing***

The newsletter has been a continued success and has been updated on a quarterly basis. The sales brochures were not updated this year since there were plenty of brochures in stock. The brochures in the upcoming year will need to be revised showing the addition on new customers and EDS. The website has been updated and continues to provide a resource for potential new and existing customers.

The DES Annual Golf tournament was successful with over a 100 attendees and the IDEA conference was attended with a brief presentation about Nashville and the upcoming conference next year. DES supported SSR in the presentation to the Engineering Consulting awards group.

### **Proposed 2005 - 2006 Sales and Marketing**

The target for the upcoming year is to take a more proactive sales and marketing position to promote DES in Nashville. The up coming IDEA national meeting will be held in Nashville and provide an increased opportunity for national exposure.

### ***Sales***

The sales success of DES needs to be continued and promoted by the identification and qualification of potential new customers. The potential customers that have already identified will remain priority sales targets for DES.

The new customer presentation and self-generation model issues need to be addressed as a priority. We need to incorporate the benefits and understanding between DES and the new HVAC technologies including perceived benefits of package units. The technical team needs actual operations and maintenance data on these systems instead on using industry standards that has not been received well by potential customers.



The sales team will take a proactive approach to identifying and qualifying existing buildings not served by DES and new buildings that are being planned. We will take an inventory of buildings not served by DES in the downtown area that are located near the EDS. This building list will be prioritized and a proactive marketing approach taken.

The development community will be targeted for relationship building including attending meetings and social events that developers attend. We need to develop a coordinated approach with city development groups in promoting the DES.

### ***Marketing***

We will continue the on-going marketing initiatives such as the newsletter, sales and marketing brochures, and continued upgrade of the DES website.

The DES Annual Golf tournament, IDEA and Chamber of Commerce will be continued in the following year. The IDEA national conference will be held in Nashville and the DES will be used for tours and customer promotion.

The sales and management staff will continue to target local engineering and business groups to provide presentations and tours of the positive attributes of DES.

### System Capacity and New Customers

	Chilled Water (tons)	Steam (PPH)
<b>Maximum Load Allowable =</b>		
<b>Installed available capacity with one unit in reserve</b>	<b>18,200</b>	<b>175,500</b>
<b>Maximum Diversified Load/0.7 =</b>		
<b>Maximum Contract Capacities</b>	<b>26,000</b>	<b>250,714</b>
<b>Initial System Customers Contractual Capacities</b>	<b>22,268</b>	<b>223,196</b>
<b>Available Capacity Remaining for Sale</b>	<b>3,732</b>	<b>27,518</b>
 <b>% of Maximum Contract Capacities Represented by the Initial System Customers</b>	 <b>85.65%</b>	 <b>89.02%</b>

### **Capacity Committed to New Customers**

	Chilled Water (tons)	Steam (PPH)
<b>Net Available Capacity to Sell</b>	<b>3,732</b>	<b>27,518</b>
<b>New Building: Hume-Fog School</b>	<b>300</b>	<b>3,000</b>
<b>Holdovers: SunTrust Bank</b>	<b>765</b>	<b>8,011</b>
<b>New Nashville Symphony Building</b>	<b>750</b>	<b>5,502</b>
<b>Beverly Briley/CJC Expansion</b>	<b>1,050</b>	<b>13,800</b>
<b>Viridian</b>	<b>400</b>	<b>0</b>
<b>Net Capacity Remaining for New Customers</b>	<b>467</b>	<b>- 2,795</b>

### **Capacity Available for New Customers**

	Chilled Water (tons)	Steam (PPH)
<b>Net Available Capacity to Sell</b>	<b>467</b>	<b>- 2,795</b>
<b>Sounds Ballpark</b>	<b>No Estimate</b>	<b>No Estimate</b>
<b>L&amp;C Tower</b>	<b>465</b>	<b>0</b>
<b>Federal Courthouse</b>	<b>1,150</b>	<b>10,053</b>
<b>Net Capacity Remaining for New Customers</b>	<b>- 1,148</b>	<b>- 12,848</b>

### *Financial Report*

The following is an explanation of the Appendices associated with this financial report.

#### **Appendix 1 - Customer List**

This chart lists the number of customers served by the District Energy System (DES). The customers are sorted according to three categories:

- Private Customers
- State of Tennessee Customers
- Metropolitan Nashville (City) Customers

The first column labeled “Buildings Served” shows the number of corporate or governmental entities served. The second column labeled “Bills Rendered” shows the number of bills sent to customers each month. All the State buildings are billed on one invoice.

#### **Appendix 2 – Revenues**

This chart summarizes the revenues charged per month by DES to each customer for fiscal year 2004 – 2005.

#### **Appendix 3 – Customer Rate Reconciliation**

Monthly Reconciliation charts from July 2004 to June 2005 are found in this appendix. The final chart is a Summary Reconciliation table for FY 04-05.

These charts detail the amount allocable to customers to the amount allocated to customers. The deficiency in the amount allocated to customers is paid by Metro and is called the Metro Funding Amount (MFA).

- a. **Facilities Capital Charge** – The debt service on revenue bonds issued for the project.
- b. **System Operator Charge** – Includes the system operator’s fee which is most of the operations and maintenance costs of the system.
- c. **EDS Improvements Charge** – Replacement and repair allowance was set at \$150,000 annually for FY 04-05.
- d. **Metro Incremental Administrative Charge** – Per the customer service agreement are the “actual, reasonable and necessary” cost over and above current Metro operating costs to manage the DES system and operator.

- e. **Pass Through Charges –**
  - i. **Water and Sewer** – The actual cost of providing water and sewer services.
  - ii. **Water Treatment Chemicals** – The actual cost of chemicals for treating water.
  - iii. **Engineering** – The engineering costs for any required capital repair or replacement project.
  - iv. **Insurance** – The cost to maintain all-risk property insurance and business insurance policies.
  - v. **EDS Electricity** – The cost of electricity for tunnel lights and safety equipment.
  - vi. **EDS Surcharge** – Surcharge to private customers only to cap their annual cost of any EDS repairs made by Metro.
- f. **Energy Charges –**
  - i. **Electricity** – The actual cost of electricity.
  - ii. **Natural Gas** – The actual cost of natural gas.
  - iii. **Propane Gas** – The actual cost of propane.